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EXAMINER

KIM, DAVID S

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/762,551	<b>Applicant(s)</b> FUTAMI ET AL.	
	<b>Examiner</b> DAVID S. KIM	<b>Art Unit</b> 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 September 2008 and 25 November 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

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## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 1-5, 10, and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma et al. (U.S. Patent No. 6,081,355, hereinafter "Sharma") in view of Rubinstein (U.S. Patent No. 3,430,048).

**Regarding claim 1**, Sharma discloses:

A method of providing a multi-wavelength light source, comprising the steps of  
modulating an optical pulse source so as to output optical pulses with a designated repetition frequency (e.g., 22 in Fig. 9);

time-division multiplexing the optical pulses output by said optical pulse source by branching (e.g., optical distributor 61) the optical pulses output by said optical pulse source to N paths and multiplexing (e.g., star coupler 62) the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency  $f_0$  ("factor of N" in col. 10, l. 29-30), wherein a time difference among the respective paths is  $1/(N*f_0)$  (a time difference between respective paths is  $T/N = (1/f_0)/N = 1/(N*f_0)$ ) because T is the pulse period, which is the inverse

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of the pulse frequency  $f_0$ ), and so that polarization states of the branched optical pulses are equal after being multiplexed (notice the co-planar characteristics of the pulses in the pulse diagram above star coupler 62, implying equal polarization states); and

demultiplexing wavelengths of the optical pulses with the repetition frequency which is the integral multiple of said designated repetition frequency so as to output said wavelengths as the multi-wavelength light source (output in Fig. 9).

Sharma does not expressly disclose:

time-division multiplexing the optical pulses output by said optical pulse source by branching the optical pulses output by said optical pulse source to N paths and multiplexing the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency  $f_0$ , wherein a time difference among the respective paths is  $1/(N \cdot f_0)$ , and so that ***intensities*** and polarization states of the branched optical pulses ***are equal after being multiplexed***.

However, time-division multiplexing so that "intensities are equal after being multiplexed" is known in the art, as exemplified by Rubinstein (e.g., "equal-amplitude pulses" in col. 2, l. 17-19, equal amplitude corresponds to equal intensity). Clearly, the intensities of the branched optical pulses of Sharma will have some kind of relationship to each other. The choices are that they could be different or they could be equal. Either choice is an obvious variation of Sharma. Thus, an obvious variation would include time-division multiplexing so that "intensities are equal after being multiplexed". Rubinstein provides an example of choosing an arrangement where they are equal. Additionally, one of ordinary skill in the art generally expects optical pulse generators to provide optical pulses with uniform characteristics, including intensity. That is, an optical pulse generator that provides optical pulses with non-uniform characteristics would introduce engineering complications related to accommodating or tolerating these non-uniform characteristics.

**Regarding claim 2**, Sharma in view of Rubinstein discloses:

An apparatus for providing a multi-wavelength light source, comprising:

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an optical pulse source which is modulated so as to output optical pulses with a designated repetition frequency  $f_0$  (22 in Fig. 9);

a time-division multiplexing unit which branches (e.g., optical distributor 61) the optical pulses output by said optical pulse source to N paths and multiplexes (e.g., star coupler 62) the branched optical pulses so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency  $f_0$  ("factor of N" in col. 10, l. 29-30), wherein a time difference among the respective paths is  $1/(N \cdot f_0)$  (a time difference between respective paths is  $T/N = (1/f_0)/N = 1/(N \cdot f_0)$  because T is the pulse period, which is the inverse of the pulse frequency  $f_0$ ), and so that intensities (Rubinstein, e.g., "equal-amplitude pulses" in col. 2, l. 17-19, equal amplitude corresponds to equal intensity) and polarization states of the branched optical pulses are equal after being multiplexed (notice the co-planar characteristics of the pulses in the pulse diagram above star coupler 62, implying equal polarization states);

and a wavelength demultiplexing unit which demultiplexes wavelengths of the optical pulses with the repetition frequency which is the integral multiple of said designated repetition frequency so as to output said wavelengths as the multi-wavelength light source (output in Fig. 9).

**Regarding claims 3-4**, Sharma in view of Rubinstein does not expressly disclose:

(claim 3) The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit is a Mach-Zehnder-interferometer-type time-division multiplexing apparatus.

(claim 4) The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit is a Michelson-interferometer-type time-division multiplexing apparatus.

However, these branching time-division multiplexing units are known and common in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ any of these or other known and common branching time-division multiplexing units in the apparatus of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since one would recognize that any suitable branching time-division multiplexing unit would provide the basic

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desired function of providing higher pulse repetition frequency in the apparatus of Sharma (e.g., col. 9, l. 51-52, 64-65; col. 10, l. 4-5, 29-31, 37-40).

**Regarding claim 5**, Sharma in view of Rubinstein discloses:

The apparatus for providing a multi-wavelength light source as claimed in claim 2, wherein said time-division multiplexing unit time-division multiplexes said optical pulses using a plurality of optical waveguides with different optical path lengths (paths from 61 in Fig. 9)

Sharma in view of Rubinstein does not expressly disclose:

said optical waveguides are arranged in a *planar lightwave circuit*.

However, planar lightwave circuits (PLCs) are well known in the art. Sharma discloses an example (51 in Fig. 8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to embody the plurality of optical waveguides of Sharma in view of Rubinstein (paths from 61 in Fig. 9) in a planar lightwave circuit. One of ordinary skill in the art would have been motivated to do this since PLCs provide more component stability than other embodiments of a plurality of optical waveguides, such as loose links of fibers.

**Regarding claims 10-11**, claims 10 and 11 are claims that introduce limitations that correspond to the limitations introduced by claims 1 and 2, respectively. Therefore, the recited limitations in claims 1-2 read on the corresponding limitations in claims 10-11.

4. **Claims 6-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Morioka et al. ("Multiwavelength picosecond pulse source with low jitter and high optical frequency stability based on 200 nm supercontinuum filtering", hereinafter "Morioka").

**Regarding claim 6**, Sharma in view of Rubinstein does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 5, wherein said wavelength demultiplexing unit is a wavelength demultiplexer having a multi-peak structure with a center transmission frequency spacing which is the integral multiple of said designated repetition frequency.

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However, Morioka discloses the use of an arrayed-waveguide grating (AWG) wavelength demultiplexing unit (Morioka, AWG in Fig. 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ such a wavelength demultiplexer in the apparatus of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since Sharma in view of Rubinstein cites the use of such a wavelength demultiplexer in the background of the art (AWG of Morioka via col. 1, l. 14-18 of Sharma). Additionally, AWGs have a multi-peak structure with a center transmission frequency spacing. Moreover, the exact value of the frequency spacing of the AWG is a flexible design parameter with a wide range that encompasses the integral multiple of said designated repetition frequency. One reasonable motivation for employing such a frequency spacing is that greater frequency spacing in wavelength demultiplexers, including the frequency spacing of an integral multiple of said designated repetition frequency, is generally associated with less demanding manufacturing and component tolerances, which leads to cheaper costs.

**Regarding claim 7**, Sharma in view of Rubinstein and Morioka discloses:

The apparatus for providing a multi-wavelength light source as claimed in claim 6, wherein said wavelength demultiplexer is an arrayed waveguide grating filter (Morioka, AWG in Fig. 1).

**Regarding claim 8**, Sharma in view of Rubinstein and Morioka does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 7, wherein said planar lightwave circuit and said arrayed waveguide grating filter are provided on one board.

However, the integration of multiple components into one unit/housing/board is an extremely common practice in the art. At the time the invention was made, it would have been obvious to one of ordinary skill in the art to do so with various components in the apparatus of Sharma in view of Rubinstein and Morioka. One of ordinary skill in the art would have been motivated to do this since it is well known that integration generally provides benefits such as more compact apparatuses, economies of scale, and faster operation speeds.

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Watanabe et al. (European Patent Application, EP 1 185 007 A2, hereinafter "Watanabe").

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**Regarding claim 9**, Sharma does not expressly disclose:

The apparatus for providing a multi-wavelength light source as claimed in claim 2, further comprising a spectrum-broadening unit which broadens spectrum of the optical pulses which are received at said time-division multiplexing unit, said spreading effected by a non-linear medium having a third-order non-linear effect.

However, such spectrum-broadening units are known in the art, as shown by Watanabe (e.g., nonlinear optical waveguides/fibers in Figs. 2-3, 9, and 15). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to include such a spectrum-broadening unit(s) to broaden the spectrum of the optical pulses which are received by the time-division multiplexing unit of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this for any variety of exemplary beneficial applications disclosed in Watanabe, such as suppression of a reduction in optical signal-to-noise ratio (Fig. 2 and paragraph [0040]) and noise removal (Figs. 3-4 and paragraphs [0044-0049]). Additionally, a broader spectrum in the apparatus of Sharma in view of Rubinstein could lead to a wavelength demultiplexing unit with less narrow frequency spacing requirements, which is generally associated with less demanding manufacturing and component tolerances, which leads to cheaper costs.

6. **Claim 12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Sharma in view of Rubinstein, as applied to the claims above, and further in view of Weiner et al. (U.S. Patent No. 7,142,789 B1, hereinafter "Weiner") and Hall et al. (U.S. Patent Application Publication No. 2002/0003641 A1, hereinafter "Hall").

**Regarding claim 12**, Sharma in view of Rubinstein does not expressly disclose:

An apparatus as in claim 2, further comprising a polarization controller through which the optical pulses output by said optical pulse source pass, and a variable optical attenuator and a variable delay unit arranged in each path, so that the intensities and the polarization states of the branched optical pulses are equal after being multiplexed.

Regarding the polarization controller, Examiner takes Official Notice that such a device is well known in the art. At the time the invention was made, it would have been obvious to one of ordinary skill



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in the art to employ a polarization controller through which the optical pulses output by said optical pulse source of Sharma in view of Rubinstein pass. One of ordinary skill in the art would have been motivated to do this for the common purpose of providing any particular arbitrary polarization state to the optical pulses of Sharma. Moreover, notice that the optical pulses output by said optical pulse source are polarized (Sharma, co-planar pulses input into 61 in Fig. 9). A polarization controller is an obvious device to provide such polarization to the optical pulses of Sharma.

Regarding the variable optical attenuator, such a device is well known in the art, as exemplified by Weiner (e.g., programmable intensity modulators in col. 2, l. 39-41, programmable attenuator in col. 6, l. 18-19, programmable intensity modulator in col. 6, l. 19-20). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a variable optical attenuator arranged in each path of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this since Sharma in view of Rubinstein is relatively silent about how to provide the “equal intensity” pulses. That is, Weiner speaks into this silence with suitable details. Notice that fixed optical attenuators of Weiner are used to provide “equal intensity” pulses (Weiner, col. 2, l. 17-21). Weiner then teaches that variable optical attenuators also constitute a suitable alternative (Weiner, col. 2, l. 39-41), so using variable optical attenuators would constitute an obvious variation.

Regarding the variable delay unit, such a device is well known in the art, as shown by Hall (252 in Fig. 8). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to employ a variable delay unit arranged in each path of Sharma in view of Rubinstein. One of ordinary skill in the art would have been motivated to do this to relieve the need to control the precise length of each path (Hall, paragraph [0101]), thus easing manufacturing tolerances.

### **Response to Arguments**

7. Applicant's arguments filed on 09 September 2008 have been fully considered but they are not persuasive. Applicant presents three salient points.

**Regarding the first point**, Applicant states:

In fact, on page 3 of the outstanding Office Action, the Examiner concedes that Sharma does not expressly disclose that intensities of the branched optical pulses are equal after being

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multiplexed. Instead, the Examiner cites Rubenstein as showing intensities being equal after being multiplexed.

However, the device of Rubenstein has a substantially different structure than the device of Sharma. For example, the device of Rubenstein does not provide the specific different paths  $1/N$ ,  $2/N$  and  $3/N$  as shown in FIG. 9 of Sharma. Therefore, it is respectfully submitted that Rubenstein should not be combined with Sharma.

(REMARKS, p. 5, last two paragraphs).

Examiner respectfully notes that the standing rejections do not rely on any combination of any structure of Sharma with any structure of Rubenstein. Rather, the standing rejections recognize that the intensities of the branched optical pulses of Sharma will have some kind of relationship to each other. The choices are that they could be different or they could be equal. Either choice is an obvious variation of Sharma. Thus, an obvious variation would include time-division multiplexing so that "intensities are equal after being multiplexed". The standing rejection simply provides Rubenstein as a known example of the concept of providing time-division multiplexing so that "intensities are equal after being multiplexed". Accordingly, this first point is not persuasive.

Furthermore, notice that the structure of Rubenstein applies a similar, if not same, principle of operation for providing time-division multiplexing as does Sharma. Notice how Sharma and Rubenstein both apply to the following portion of claim 1:

time-division multiplexing the optical pulses output by said optical pulse source (Sharma, e.g., optical distributor 61; Rubenstein, e.g., the four branched paths in Fig. 2) by branching the optical pulses output by said optical pulse source to  $N$  paths and multiplexing the branched optical pulses (Sharma, e.g., star coupler 62; Rubenstein, multiplexing of branched pulses along output path 122) so as to output optical pulses with a repetition frequency which is an integral multiple of said designated repetition frequency  $f_0$  (Sharma, "factor of  $N$ " in col. 10, l. 29-30; Rubenstein, "four times the rate at which pulses are generated by the signal source 100" in col. 6, l. 60-63), wherein a time difference among the respective paths is  $1/(N \cdot f_0)$  (Sharma, a time difference between respective paths is  $T/N = (1/f_0)/N = 1/(N \cdot f_0)$  because  $T$  is the pulse period, which is the inverse of the pulse frequency  $f_0$ ; Rubenstein, e.g., suggested by the regular spacing of pulses in  $t_1$  to  $t_5$  in Fig. 3 and proportioning of paths in col. 5, l. 58-62).

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Thus, the teachings of Rubinstein would most certainly provide concepts applicable to the teachings of Sharma. Accordingly, Applicant's first point is even more unpersuasive.

**Regarding the second point**, Applicant states:

Moreover, Rubinstein has significantly different polarization states than Sharma. Therefore, the overall operation of Rubinstein is significantly different than Sharma. Accordingly, it is respectfully submitted that Rubinstein should not be combined with Sharma in the manner proposed by the Examiner.

Moreover, please note that Rubinstein does not disclose or suggest that polarization states of the branched optical pulses are equal after being multiplexed as recited, for example, in claim 1.

(REMARKS, p. 6, 1<sup>st</sup> two paragraphs).

Again, Examiner respectfully notes that the standing rejections do not rely on any combination of any structure of Sharma with any structure of Rubinstein. Rather, the standing rejection simply provides Rubinstein as a known example of the concept of providing time-division multiplexing so that "intensities are equal after being multiplexed". Furthermore, the standing rejection notes that Sharma already includes the teaching of "polarization states of the branched optical pulses are equal after being multiplexed" (Sharma, notice the co-planar characteristics of the pulses in the pulse diagram above star coupler 62, implying equal polarization states). Accordingly, this point is not persuasive.

**Regarding the third point**, Applicant states:

Claim 12 specifically recites a variable optical attenuator and a variable optical delay unit arranged in each path, so that the intensities and the polarization states of the branched optical pulses are equal after being multiplexed. See, for example, in FIG. 5, and the disclosure on page 9, line 25, through page 10, line 4, of the specification.

For example, FIG. 5 discloses a variable optical attenuator 43, 44 and a variable optical delay unit 45, 46 arranged in each path.

**In contrast, FIG. 9 of Sharma is clear in that there are no mechanisms inserted in the different paths 1/N, 2/N, 3/N.**

Moreover, on page 7 of the outstanding Office Action, the Examiner concedes that Sharma in view of Rubinstein does not expressly disclose the features of claim 12.

It is respectfully submitted that the device of Sharma is not intended to have any type of device inserted into the different optical paths 1/N, 2/N, 3/N. For example, any required devices in Sharma are used before or after the different optical paths 1/N, 2/N, 3/N.

(REMARKS, p. 6, middle section, emphasis Applicant's).

Examiner respectfully notes that Applicant raised this same point in the Applicant's previous remarks filed on 28 February 2008 (REMARKS, p. 6). In response, Examiner provided arguments that incorporate teachings from Weiner and Hall (see the treatment of claim 12 in the Office Action mailed on 13 June

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2008, also included above in the treatment of claim 12 in this current Office Action). Applicant's third point does not address any of the merits of these arguments that incorporate teachings from Weiner and Hall. Accordingly, this point is not persuasive.

Additionally, Examiner respectfully notes that Sharma is silent about any positive recitation of a *lack* of mechanisms inserted in the different paths 1/N, 2/N, 3/N, or even any intention of such a lack of mechanisms inserted in the different paths 1/N, 2/N, 3/N. Rather, Sharma focuses on "paths that provide relative *delaying*" (col. 10, l. 25). Thus, Applicant is speaking into a silent portion of Sharma. Even though Sharma may not positively show or describe any particular mechanism in the paths 1/N, 2/N, 3/N, Sharma does not positively recite that there are "no mechanisms" inserted in the different paths 1/N, 2/N, 3/N. That is, the presence or absence of any mechanisms may simply be outside of the scope of Sharma's focus on "paths that provide relative *delaying*". Accordingly, Applicant's third point is even more unpersuasive.

**Summarily**, Applicant's arguments are not persuasive. Accordingly, Examiner respectfully maintains the standing rejections.

### **Conclusion**

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID S. KIM whose telephone number is (571)272-3033. The examiner can normally be reached on Mon.-Fri. 9 AM to 5 PM (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth N. Vanderpuye can be reached on 571-272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. S. K./  
Examiner, Art Unit 2613

/Kenneth N Vanderpuye/  
Supervisory Patent Examiner, Art Unit 2613